Appendix C

VTBB operation: Laboratory procedure manual

RTMLP Safety.1	**Safety Issues**
RTMLP1	**Running General Data Taking Program**
RTMLP11:	**VTBB Operation**

Written by:	Charles Gibson	Procedure:	RTMLP1
Approved by:	…….	Date:	…….
Revised by:	…….	Date:	…….

Safety Issues

Safety glasses are required in the laboratory at all times.

The following hazards have been identified in this laboratory. Safety measures are in place to reduce the risk of injury from the hazards below.

BRIGHT SOURCE
Avoid staring at the source
Can cause eye damage
Use the correct neutral density filter when viewing is required

BURN
Keep body and clothes away

COLLISION
Keep the boxcar path clear
Do not hang cables from boxcar

ELECTROCUTION
High voltage connections present
Do not touch electrical parts

LASER
Avoid staring into a laser
Can cause eye damage
Block laser or turn off when not in use

Displays, similar to the one below, are used throughout this document to alert the operator to potential hazards.

Written by:	Charles Gibson	Procedure:	RTMLP1
Approved by:	…….	Date:	…….
Revised by:	…….	Date:	…….

Running the General Data Taking Program

1. Turn on the computer
2. Enter the **password** to work online, or click on the **Cancel** button to work offline
3. Load the Visual Basic program: *c:\programs\datatakn\pyro.mak* (do one of the following)
   a. Click on the **Pyro.mak** shortcut icon
   b. Double click on the folder *c:\programs\datatakn\pyro.mak* using Windows Explorer
4. Run the program (do one of the following)
   a. Press F5
   b. Click on the _ tool bar icon
   c. Click on the menu item "**Run**" then on "**Start**"
5. The ***Hardware.frm*** is used to set up the equipment with settings used by other programs
6. The ***Software.frm*** is used to input data used by other programs
7. All other programs can be run from these forms

Optical Technology Division (844)
Radiance Temperature Measurements Laboratory Procedure
Variable-Temperature Blackbody Operation

Written by:	Charles Gibson	Procedure:	RTMLP11
Approved by:	…….	Date:	…….
Revised by:	…….	Date:	…….

VTBB Operation

CAUTION
BRIGHT SOURCE
BURN
ELECTROCUTION

1. Turn On Procedure

a. Open tap water valve 1/8 turn
b. Check that the blue box flow rate is about 2 GPM
c. Open chilled water valves
   i. open supply valve 1/4 turn
   ii. fully open return valve
d. Press the reset button on the blue water switch box to select chilled water
e. Check that the blue box flow rate is about 5 GPM
f. Fully open the argon cylinder valve
g. Turn on the argon alarm and check that it trips at 10 CFH
h. Purge the BB using a argon flow rate of 70 CFH
   i. Cover both BB openings for 5 s with your hands
   ii. Uncover one end and wait 5 s
   iii. Cover both BB openings for 5 s with your hands
   iv. Uncover the other end and wait 5 s
i. Repeat step h 5 times
j. Reduce the argon flow rate to 10 CFH
k. Check that the BB housing is cool and that the argon is flowing
l. Insert correct detector filter for the initial set point
   i. Filter 0, 700 to 1300 °C, Low with insulation (LIN)
   ii. Filter 1, 1300 to 1800 °C, Medium (MED)
   iii. Filter 2, 1800 to 2500 °C, High (HI)
   iv. Filter 3, 2500 to 3100 °C, Extra High(XH)
m. Switch control mode to [MANUAL]
n. Turn the potentiometer to 0
o. Press the [START], [WATER ON], and [RUN] buttons
   i. Note: The BB does not control the chilled water flow the automatic BB shut off switch has been disabled
p. Turn the potentiometer slowly until the voltmeter reads between 150 VAC and 200 VAC (sets BB below 1300 °C)

2. Operating Procedure

a. Run the BB control program
   i. Program is BBPROG.PRG in BetterBasic
   ii. Enter BB at the DOS prompt
   iii. Enter measurement direction
      (1) '0' to run high to low
      (2) '1' to run low to high
   iv. Enter set point unit
      (1) 'C' for ° C
      (2) 'F' for ° F
   v. Enter temperature range
      (1) LOW
      (2) LIN
      (3) MED
      (4) HI
      (5) XH
   vi. Insert the correct filter and press [Enter]
b. Press [Shift S] to enter the initial set point
c. Adjust the potentiometer until the temperature is 20 °C above the set point
d. Switch the control mode to [PC] to maintain the set point

WARNING!
DO NOT INCREASE THE SET POINT BY STEPS LARGER THAN 20 °C TO REDUCE DAMAGE TO THE BB

e. Select a new set point (the set point is in °C or °F depending on set point unit selected)
   i. Press [Shift S] to enter the set point
   ii. Use the numeric keypad to increment the set point
      (1) Press the increment key
         (a) 100 °C ('7' key)
         (b) 10 ('4' key)
         (c) 1 ('1' key)
         (d) 0.1 ('0' key)
      (2) Press the Arrow key to set the new set point
         (a) ↑, to increase the set point ('8' key)
         (b) ↓, to decrease the set point ('2' key)

f. If the new set point is not in the current range then the program will pause (suspending BB control)

i. Depending on the measurement direction the default set points are
(1) High to low default set points
(a) XH 2500 °C
(b) HI 2300 °C
(c) MED 1800 °C
(d) LOW 1300 °C
(2) Low to high default set points
(a) LOW 800 °C
(b) MED 1300 °C
(c) HI 1800 °C
(d) XH 2500 °C

ii. If the new set point is not the default value, then switch the control mode to [MANUAL]
iii. The program will loop to step 2.a.v. (see ☞)

3. EMERGENCY TURN OFF Procedure

a. Press the [EMERGENCY STOP] button on the power supply (the chilled water and argon will continue flowing)
b. Continue with steps 4.b. to 4.j.

4. Turn Off Procedure

a. Switch the control mode to [MANUAL]
b. Turn to potentiometer to 0
c. Press the [EMERGENCY STOP] button on the power supply (the chilled water and argon will continue flowing)
d. Switch off the main breaker on the wall
e. Wait until the furnace has stopped glowing
f. Close the chilled water supply valve
g. Close the chilled water return valve
h. Close the cold water supply valve
i. Close the argon cylinder valve
j. Close the argon flow meter valve